

WHAT IS CLAIMED IS:

1. A photoelectric converter comprising a photoelectric conversion element of a laminated structure comprising:

5 a first electrode layer;

an insulation layer for blocking the passage of a first carrier and a second carrier having different polarity from the first carrier;

a photoelectric conversion semiconductor layer;

10 an injection blocking layer for blocking the injection of the first carrier to the photoelectric conversion semiconductor layer; and

a second electrode layer;

15 wherein a switching means is provided for operating the converter by switching the following three operation modes a) through c) for applying an electric field to each layer of the photoelectric conversion element;

20 a) an idling mode for emitting the second carrier from the photoelectric conversion element;

b) a refreshment mode for refreshing the first carrier accumulated in the photoelectric conversion element; and

25 c) a photoelectric conversion mode for generating pairs of the first carrier and the second carrier in accordance with an amount of incident light to accumulate the first carrier.

2. The photoelectric converter according to claim 1, wherein a potential difference ( $V_{dg}[\text{idle}]$ ) obtained by subtracting the potential of the second electrode layer from the potential of the first electrode layer of the photoelectric conversion element in the idling mode is a positive value ( $0 < V_{dg}[\text{idle}] < V_{dg}[\text{read}]$ ) smaller than the potential difference  $V_{dg}[\text{read}]$  obtained by subtracting the potential of the second electrode layer from the potential of the first electrode layer of the photoelectric conversion element in the photoelectric conversion mode.

3. The photoelectric converter according to claim 1, wherein a recess mode of the photoelectric conversion element is provided for applying a zero electric field to each layer.

4. A method for driving a photoelectric converter comprising a photoelectric conversion element of a laminated structure comprising a first electrode layer, an insulation layer for blocking the passage of a first carrier and a second carrier having different polarity from the first carrier, a photoelectric conversion semiconductor layer, an injection blocking layer for blocking the injection of the first carrier to the photoelectric semiconductor layer, and a second electrode layer; the method comprising the following

three operation modes a) through c) for applying an electric field to each layer of the photoelectric conversion element;

5 a) an idling mode for emitting the second carrier from the photoelectric conversion element;

b) a refreshment mode for refreshing the first carrier accumulated in the photoelectric conversion element; and

10 c) a photoelectric conversion mode for generating pairs of the first carrier and the second carrier in accordance with an amount of incident light to accumulate the first carrier.

15 5. The method for driving a photoelectric converter according to claim 4, wherein a potential difference ( $V_{dg}[\text{idle}]$ ) obtained by subtracting the potential of the second electrode layer from the potential of the first electrode layer of the photoelectric conversion element in the idling mode is  
20 a positive value ( $0 < V_{dg}[\text{idle}] < V_{dg}[\text{read}]$ ) smaller than the potential difference  $V_{dg}[\text{read}]$  obtained by subtracting the potential of the second electrode layer from the potential of the first electrode layer of the photoelectric conversion element in the photoelectric  
25 conversion mode.

6. The method for driving the photoelectric converter according to claim 4, wherein a recess mode of the photoelectric conversion element is provided for applying a zero electric field to each layer.

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7. The photoelectric converter according to claim 1, wherein a plurality of the photoelectric conversion elements are arranged one-dimensionally or two-dimensionally, a switching element is connected for each of the photoelectric conversion elements, all the photoelectric conversion elements are divided into a plurality of  $n$  blocs, a light signal of  $n \times m$  of all the photoelectric conversion elements divided into  $n$  blocs is output with a matrix signal wiring by operating the switching element for each of the blocs, an intersection part of the matrix signal wiring comprises a lamination structure in which at least a first electrode layer, an insulating layer, a semiconductor layer and a second electrode layer are provided in this order, and each layer of the lamination structure is formed with the same layer as each of the first electrode layer, the insulating layer, photoelectric conversion semiconductor layer and the second electrode layer of the photoelectric conversion element.

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8. A system comprising:

the photoelectric converter according to claim 1,  
the photoelectric converter having a phosphor for  
converting input radiation into light;

5 a signal processing means for processing a signal  
from the photoelectric converter;

a recording means for recording a signal from the  
signal processing means;

a display means for displaying a signal from the  
signal processing means;

10 an electric transmission means for electrically  
transmitting a signal from the signal processing means;  
and

a radiation source for generating radiation.